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A hollow complete denture using Thermocol: A case report

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Abstract

The success of a complete denture relies on the principles of retention, stability and support. The prosthodontist's skill lies in applying these principles efficiently in critical situations. Severely resorbed maxillary edentulous ridges that are narrow and constricted with increased inter ridge space provide decreased support, retention and stability. The consequent weight of the processed denture only compromises them further. This article describes a case report of an edentulous patient with resorbed ridges where a simplified technique of fabricating a light weight maxillary complete denture was used for preservation of denture bearing areas.

Keywords: Complete dentures, hollow maxillary denture, inter ridge distance, light weight dentures, residual ridge resorption

Introduction

The extremely atrophic maxillary ridge poses a clinical challenge in construction of a successful complete denture. In addition, increased interridge distance often results in heavy maxillary complete denture that further decreases the retention of the prosthesis. Decreasing the weight of a maxillary prosthesis has been shown to be beneficial when fabricating a maxillary complete denture for the restoration of a large maxillofacial defect^[1, 2].

Although not universally accepted, it has been suggested that gravity and the addition of weight to the mandibular complete denture may aid in retention. Reducing the weight of a maxillary prosthesis, however, has been shown to be advantageous when fabricating an obturator for the restoration of a large maxillofacial defect. Given the high volume of the denture base material in prostheses provided to patients with large maxillofacial defects or extreme residual ridge resorption, reduction in prosthesis weight may be achieved by making the denture base hollow^[3].

Numerous methods and materials have been used to fabricate a light weight denture. These methods include using a solid 3D spacer, cellophane wrapped asbestos, silicone putty, modelling clay, thermocol, salt, and fabricating dentures in two halves. The advantage of a hollow maxillary denture is the reduction of excessive weight of acrylic resin, which normally replaces lost alveolar ridge in the interridge space of the denture wearer^[4].

Holt (1981) processed a shim of indexed acrylic resin over the residual ridge and used a spacer which was then removed and the two halves luted with auto polymerized acrylic resin^[5].

Fattore *et al* (1988), used a variation of the double flask technique for obturator fabrication by adding heat polymerized acrylic resin over the definitive cast and processing a minimal thickness of acrylic resin around the teeth using different drag. Both portions of resin were attached using a heat polymerized resin^[6].

O'Sullivan *et al* (2004) described a modified method for fabricating a hollow maxillary denture. A clear matrix of the trial denture base was made. The trial denture base was then invested in the conventional manner till the wax elimination. A 2mm heat polymerized acrylic shim was made on the master cast, using a second flask. Silicone putty was placed over the shim and its thickness was estimated using a clear template. The original flask with the teeth was then placed over the putty and the processing was done. The putty was later removed from the distal end of the denture and the openings were sealed with autopolymerizing resin.

The technique was useful in estimation of the spacer thickness, but removal of the putty was found to be difficult especially from the anterior portion of the denture. Moreover, the

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openings made on the distal end had to be sufficiently large to retrieve the hard putty [3].

This clinical report describes a case report of edentulous patients with resorbed ridges by fabricating a light weight hollow maxillary complete denture using thermocol.

Case Report

A 65 year old male patient reported to the Department of Prosthodontics of H.P. Government Dental College and Hospital, Shimla, with the chief complaint of difficulty in chewing food and wanted prosthetic rehabilitation for the same. (Fig.1) History revealed that patient was edentulous for past 4 years. Past medical history revealed no underlying systemic disorders.

Intraoral examination revealed resorbed maxillary and mandibular edentulous ridges with increased inter-ridge distance. Labial, buccal mucosa, hard palate, soft palate, and floor of mouth were normal. (Fig. 2) Hence, hollow maxillary complete denture and conventional mandibular denture was planned for this patient.



Fig 1: Pre-operative Extraoral Profile View.



Fig 2: Resorbed maxillary edentulous ridge.

Technique

1. The maxillary denture was fabricated up to the trial denture stage in the conventional manner.
2. The land area of the cast was indexed using a conical bur at three points (one incisor and two molar region) and the trial denture was sealed to the definitive cast.
3. Trial denture with indexed cast was duplicated using irreversible hydrocolloid and poured with dental stone. A template of the duplicated trial denture was made with clear autopolymerising resin.
4. The trial denture was then processed in the standard manner upto the wax elimination stage.
5. Two layers of baseplate wax were adapted to the definitive cast in the drag. A second flask was used to invest this baseplate wax and processed in conventional manner to fabricate a heat cure denture base. (Fig. 3)
6. After deflasking the clear template was placed on the definitive cast with denture base using the indices in the land area as seating guides. A line was drawn on the clear template joining the cervical end of all teeth and another

line 2mm parallel to previous line towards the denture base was drawn. (Fig. 4)

7. An endodontic file with a rubber stop was used to measure the space between the template and the processed denture base in different region. (Fig. 5) Available space was calculated by subtracting the measured file length to the space between template and second line. Therefore, the spacer would occupy the area between the second line and the denture base.
8. A denser thermocol was placed over the bur roughened denture base along the ridge and luted with cyanoacrylate. (Fig. 6) The spacer thickness was modified according to the calculation done above, leaving 2 mm from the cervical end of teeth to the denture base.
9. The other half of the flask having teeth was removed and verification of complete closure of flask was done. Then acrylic resin was mixed, packed and processed in the conventional manner. Pre insertion occlusal corrections were made and the denture was inserted in the patient's mouth. (Fig. 7 and 8).



Fig 3: Processed heat cure record base



Fig 4: A line 2mm parallel to cervical line drawn.



Fig 5: File Used To Measure Space between Matrix and Base



Fig 6: Thermocol luted to the denture base.



Fig 7: Hollow Denture Floating In Jar



Fig 8: Denture inserted in the patient's mouth

Discussion

Hollow maxillary complete denture considerably reduces the weight of the prosthesis, which in turn prevents transmission of the detrimental forces, which would otherwise be transmitted from a conventional heavy prosthesis to the underlying tissue and bone. Thus, it helps to preserve underlying tissue and bone [7]. The method described has advantages over the previously described techniques. Thermocol being a light weight material can be left in the denture without compromising the integrity of the denture, avoiding the tedious effort to remove the spacer material from the denture. Moreover, the small window in the cameo surface in the previous techniques has potential for leakage between the heat polymerized resin and auto polymerized resin portions. This technique is simple to execute and allows control of spacer thickness [8].

Conclusion

Using thermocol is a simplified technique for fabricating light weight maxillary denture where thermocol can be left in the denture as a spacer without compromising denture strength.

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